

Appl. No. 10/816,015
Amdt. Dated December 13, 2006
Reply to Office Action of September 13, 2006

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This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) An imaging system comprising:

one or more distributed X-ray sources substantially surrounding an imaging volume and configured to generate X-ray radiation towards the imaging volume;

one or more detectors for receiving the X-ray radiation after attenuation in the imaging volume and processing corresponding signals to produce measurement volumetric data; and

a source controller for triggering one or more emitters in the one or more distributed X-ray sources at each instant in time of an image acquisition for creating multiple projections for acquiring volumetric data by the one or more detectors,

wherein the one or more distributed X-ray sources and/or the one or more detectors are arranged about a scanner aperture such that at least one of the one or more distributed X-ray sources or detectors rotate around the scanner aperture in relation to the imaging volume during an imaging sequence.

2. (cancel)

3. (currently amended) The imaging system of claim 1-2 wherein the one or more distributed X-ray sources includes comprise one or more two-dimensional arrays of source elements extending substantially around the aperture.

4. (currently amended) The imaging system of claim 1-2 wherein the one or more distributed X-ray sources includes comprise one or more two-dimensional arrays of source elements extending around a portion of the aperture.

5. (currently amended) The imaging system of claim 1-2 wherein the one or more distributed X-ray sources includes comprise one or more one-dimensional arrays of source elements extending substantially around the aperture.

6. (original) The imaging system of claim 5 further comprising:

one one-dimensional array of source elements extending substantially around the aperture; and
one or more line sources.

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7. (original) The imaging system of claim 5 further comprising:

two or more one-dimensional arrays of source elements extending substantially around the aperture;
and
one or more line sources.

8. (currently amended) The imaging system of claim 2 1 wherein the one or more distributed X-ray sources includes comprise one or more one-dimensional arrays of source elements extending around a portion of the aperture.

9. (currently amended) The imaging system of claim 2 1 wherein the one or more detectors comprise at least one distributed detector includes one or more two-dimensional arrays of detector elements extending around at least a portion of the aperture.

10. (currently amended) The imaging system of claim 2 1 wherein the one or more detectors comprise at least one distributed detector includes one or more one-dimensional arrays of detector elements extending around at least a portion of the aperture.

11. (currently amended) The imaging system of claim 2 1 wherein the one or more distributed X-ray sources includes comprise one or more line sources.

12. (currently amended) The imaging system of claim 1 wherein the one or more distributed X-ray sources includes comprise a plurality of independently addressable source elements arranged in one or more arrays.

13. (currently amended) The imaging system of claim 1 wherein the one or more distributed X-ray sources comprises comprise:

a cold cathode emitter housed in a vacuum housing; and,
a stationary anode disposed in a vacuum housing and spaced apart from the cold cathode emitter.

14. (currently amended) The imaging system of claim 1 wherein the one or more distributed X-ray sources comprises comprise addressable emission devices and the emission devices comprises comprise thermionic emitters, cold-cathode emitters, carbon-based emitters, photo emitters, ferroelectric emitters, laser diodes, or monolithic semiconductors.

15. (currently amended) The imaging system of claim 1 wherein the one or more distributed X-ray sources comprises comprise at least one distributed source configured to rotate around the scanner aperture and the one

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or more detectors ~~comprises~~ comprise at least one stationary and distributed detector positioned about the scanner aperture.

16. (original) The imaging system of claim 15 wherein the at least one distributed source includes one or more two-dimensional arrays of source elements.

17. (original) The imaging system of claim 15 wherein the at least one distributed source includes one or more one-dimensional arrays of source elements.

18. (currently amended) The imaging system of claim 15 17 wherein the one or more one-dimensional arrays of source elements extend around at least a portion of the aperture.

19. (original) The imaging system of claim 18 further comprising a one-dimensional array of source elements extending around at least a portion of the aperture, and one or more line sources.

20. (original) The imaging system of claim 18 further comprising two or more one-dimensional arrays of source elements extending around at least a portion of the aperture and one or more line sources.

21. (currently amended) The imaging system of claim 17 wherein the at least one of the one or more one-dimensional arrays of source elements ~~includes~~ includes at least one line source extending at least along a Z-direction.

22. (previously presented) The imaging system of claim 21, wherein the at least one line source comprises a target configured as a hollow cylinder rotating around an axis of the hollow cylinder.

23. (original) The imaging system of claim 15 wherein the at least one stationary and distributed detector includes one or more two-dimensional arrays of detector elements extending substantially around the aperture.

24. (original) The Imaging system of claim 15 wherein the at least one stationary and distributed detector includes one or more two-dimensional arrays of detector elements extending around a portion of the aperture.

25. (original) The Imaging system of claim 15 wherein the at least one stationary and distributed detector includes one or more one-dimensional arrays of detector elements extending substantially around the aperture.

26. (original) The Imaging system of claim 15 wherein the at least one stationary and distributed detector includes one or more one-dimensional arrays of detector elements extending around a portion of the aperture.

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27. (currently amended) The imaging system of claim 1 wherein the one or more distributed X-ray sources ~~comprises~~ comprise at least one distributed source configured to rotate around the scanner aperture and the one or more detectors ~~comprises~~ comprise at least one distributed detector configured to rotate around a scanner aperture.

28. (original) The imaging system of claim 27 wherein the at least one distributed source includes one or more two-dimensional arrays of source elements.

29. (original) The imaging system of claim 27 wherein the at least one distributed source includes one or more one-dimensional arrays of source elements.

30. (currently amended) The imaging system of claim ~~27~~ 29 wherein the one or more one-dimensional ~~array~~ arrays of source elements extend around at least a portion of the aperture.

31. (original) The system of claim 30 further comprising a one-dimensional array of source elements and one or more line sources.

32. (original) The system of claim 30 further comprising two or more one-dimensional arrays of source elements and one or more line sources.

33. (currently amended) The imaging system of claim 29 wherein at least one of the one or more one-dimensional arrays of source elements includes at least one line source extending at least along a Z-direction.

34. (previously amended) The imaging system of claim 33, wherein the at least one line source comprises a target configured as a hollow cylinder rotating around an axis of the hollow cylinder.

35. (original) The imaging system of claim 27 wherein the at least one distributed detector includes one or more two-dimensional arrays of detector elements extending around at least a portion of the aperture.

36. (original) The imaging system of claim 27 wherein the at least one distributed detector includes one or more one-dimensional arrays of detector elements extending around at least a portion of the aperture.

37. (currently amended) An X-ray imaging system for scanning a volume to be imaged, the system comprising:

one or more distributed X-ray sources substantially surrounding an imaging volume and configured to emanate an X-ray radiation;

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a control circuit operably coupled to the distributed X-ray sources;
one or more detectors for receiving the X-ray radiation after attenuation in the imaging volume;
a source controller for triggering one or more emitters in the one or more distributed X-ray sources at each instant in time of an image acquisition for creating multiple projections for acquiring volumetric data by the one or more detectors;
a motor controller configured to displace at least one of the one or more distributed X-ray sources, and the one or more detectors;
a processing circuit operably coupled to the one or more detectors configured to receive the a plurality of projection images and to form one or more reconstructed slices representative of the volume being imaged; and
an operator workstation operably coupled to the processing circuit configured to display the one or more reconstructed slices,
wherein the one or more distributed X-ray sources and/or the detectors are arranged about a scanner aperture such that at least one of the one or more distributed X-ray sources or detectors rotate about a scanner aperture in relation to the imaging volume during an imaging sequence.

38. (cancel)

39. (currently amended) The X-ray imaging system of claim 37 wherein the one or more distributed X-ray sources comprise comprises at least one distributed source configured to rotate around the scanner aperture and the one or more detectors comprise comprises at least one distributed detector configured to rotate around a scanner aperture.

40. (currently amended) The X-ray imaging system of claim 37 wherein the one or more distributed X-ray sources comprise comprises at least one distributed source configured to rotate around the scanner aperture and the one or more detectors comprise comprises at least one stationary and distributed detector positioned about the scanner aperture.

41. (currently amended) A method of scanning a volume to be imaged, the method comprising:
providing one or more distributed X-ray sources substantially surrounding an imaging volume for generating X-ray radiation towards the imaging volume;
providing one or more detectors for receiving the X-ray radiation after attenuation; and
providing a source controller for triggering one or more emitters in the one or more distributed X-ray sources at each instant in time of an image acquisition for creating multiple projections for acquiring volumetric data by the one or more detectors,
wherein generating and receiving the X-ray radiation is accomplished by rotating at least one of the one or more distributed X-ray sources about a scanner aperture or detectors in relation to the imaging volume during an imaging sequence.

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42. (cancel)

43. (original) The method of claim 41 wherein providing the one or more distributed X-ray sources comprises providing at least one distributed source configured to rotate around the scanner aperture and providing the one or more detectors comprises providing at least one distributed detector configured to rotate around a scanner aperture.

44. (original) The method of claim 41 wherein providing the one or more distributed X-ray sources comprises providing at least one distributed source configured to rotate around the scanner aperture and providing the one or more detectors comprises providing at least one stationary and distributed detector positioned about the scanner aperture.

45. (new) An imaging system comprising:

one or more distributed X-ray sources substantially surrounding an imaging volume and configured to generate X-ray radiation towards the imaging volume, wherein the one or more distributed X-ray sources comprise at least one stationary distributed source positioned about a scanner aperture;

one or more detectors for receiving the X-ray radiation after attenuation in the imaging volume and processing corresponding signals to produce measurement volumetric data, wherein the one or more detectors comprises at least one distributed detector configured to rotate around the scanner aperture.; and

a source controller for triggering one or more emitters in the one or more distributed X-ray sources at each instant in time of an image acquisition for creating multiple projections for acquiring volumetric data by the one or more detectors.

46. (new) An X-ray imaging system for scanning a volume to be imaged, the system comprising:

one or more distributed X-ray sources substantially surrounding an imaging volume and configured to emanate an X-ray radiation, wherein the one or more distributed X-ray sources comprises at least one stationary distributed source positioned about a scanner aperture;

a control circuit operably coupled to the distributed X-ray sources;

one or more detectors for receiving the X-ray radiation after attenuation in the imaging volume, wherein the one or more detectors comprise at least one distributed detector configured to rotate around the scanner aperture.;

a source controller for triggering one or more emitters in the one or more distributed X-ray sources at each instant in time of an image acquisition for creating multiple projections for acquiring volumetric data by the one or more detectors;

a motor controller configured to displace at least one of the distributed X-ray sources, and the detectors;

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a processing circuit operably coupled to the detectors configured to receive the plurality of projection images and to form one or more reconstructed slices representative of the volume being imaged; and
an operator workstation operably coupled to the processing circuit configured to display the one or more reconstructed slices.

47. (new) A method of scanning a volume to be imaged, the method comprising:

providing at least one stationary distributed X-ray source positioned substantially surrounding an imaging volume for generating X-ray radiation towards the imaging volume;

providing at least one distributed detector configured to rotate around a scanner aperture and configured for receiving the X-ray radiation after attenuation; and

providing a source controller for triggering one or more emitters in the one or more distributed X-ray sources at each instant in time of an image acquisition for creating multiple projections for acquiring volumetric data by the one or more detectors.